

III. REMARKS

In the Office Action, claims 1-5 and 8-18 were rejected under 35 U.S.C. 103 as being unpatentable over Manjunath (US 6,456,964) in view of Kleijn (US 6,223,151) for reasons set forth in the Action. Claim 7 was rejected under 35 U.S.C. 103 as being unpatentable over Manjunath (US 6,456,964) in view of Kleijn (US 6,223,151) and Kleijn (US 5,517,595) for reasons set forth in the Action. Claim 6 was rejected under 35 U.S.C. 103 as being unpatentable over Manjunath (US 6,456,964) in view of Kleijn (US 6,223,151) and Donovan (US 6,266,637) for reasons set forth in the Action.

In the foregoing rejections, the Examiner cites a new reference, Manjunath (US 6,456,964) as the primary reference for rejection of the claims.

The following argument is presented to show that the amendments to the independent claims 1, 8, 12, and 15 overcome the foregoing grounds of rejection so as to present allowable subject matter in the independent claims as well as in their respective dependent claims.

Manjunath discloses a method for coding a quasi-periodic speech signal. A residual signal is generated by filtering the speech signal with an LPC analysis/liter. The residual signal is divided into consecutive prototype periods. Two consecutive periods are compared and a first set of parameters describes the change between these periods (the previous and the current prototype periods) and gives data for prediction of the next period. Codevectors are selected so that a sum of the codevectors estimates the difference between the predicted previous period and the current period. The selected codevectors are described by the second set of parameters. Output speech signal is synthesized by reconstructing the current prototype period from the first and second sets of parameters. The residual signal to be synthesized is interpolated from the previous reconstructed prototype period to the current reconstructed prototype period and finally, the speech is synthesized based on the interpolated residual signal.

The examiner acknowledges (Page 3 of the Action, beginning at line 3) that certain subject matter of the claims, added in the previous response, is not taught by Manjunath, and relies on Kleijn '151 to show this subject matter.

Attention is directed to the second feature ("determining an estimate..") and third feature ("modifying the formulated signal..") of present claim 1 with the wording prior to the present amendment. Corresponding language appears in the other independent claims. Upon comparing the teachings of the present specification with the teachings of Kleijn '151, the following is noted.

With respect to the present claims, the relevant features are thus "determining an estimate of periodicity from the formulated signal by estimating pitch pulse locations from the formulated signal" and "modifying the formulated signal using the periodicity estimate such that the pitch period of the formulated signal is changed and that the periodicity is improved". According to the description of the present specification, a pitch pulse position $t(u)$ is achieved from each frame of the time domain signal. After that, estimates for pitch periods are calculated and thus, pitch cycles $d(u)$ are achieved. Then, an average value of all the pitch cycles is calculated (\bar{d}_{norm}). After this, a procedure called pitch normalization affects the unequally spaced pitch pulses so that the pitch pulses are located equally spaced along the time axis after the normalization.

The corresponding part in Kleijn '151 (column 4, line 66 to column 5, line 5) discloses that estimates for pitch periods are calculated first. The estimates are interpolated and rounded and thereafter, markers are put in the locations of the pitch pulses (in the time axis). These markers thus separate the pitch periods (pitch cycles) from each other.

Concerning the signal modifying process, as mentioned in col. 5, lines 51-52 and Figure 2, Kleijn '151 shows that the previously mentioned cycles are fine adjusted in functional block 490 so that the periodicity improves. This is done by calculating cross-correlations

between consecutive pitch cycles. In practice, the modifications are performed to the signal by repeating or deleting samples and thus, pitch periods also change.

In order to emphasize the differences between the presently claimed subject matter and the cited references, independent claims 1, 8, 12 and 15 are amended to teach that:

there is a modification of the formulated signal using the periodicity estimate such that the pitch pulses are spaced substantially equally along a time axis and thus, changing pitch periods of the formulated signal and improving periodicity.

The processing of the pitch pulses in a way that their locations in the time axis will be equally spaced is added in the above-noted third feature of each of the independent claims. Support for the amendment can be found in page 9, lines 12-14 and page 11, lines 1-8 of the present specification. It is urged that the subject matter according to the amended claim 1, and in corresponding fashion to the other amended independent claims, is not disclosed in any of the cited references, and that it is not obvious to the person skilled in the art.

Therefore, in view of the foregoing argument, it is urged that the amended set of claims has overcome the rejections under 35 U.S.C. 103(a) to provide allowable subject matter.

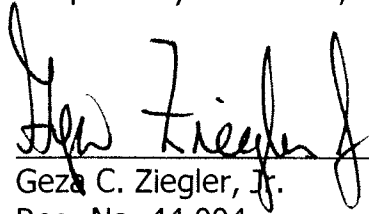
For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

09/871,086

Response to Office Action mailed February 27, 2006

The Commissioner is hereby authorized to charge payment of \$1020.00 for a three-month extension of time as well as for any other fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,



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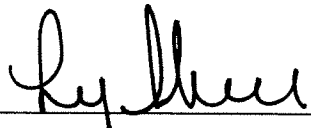
28 August 2006
Date

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Lisa Shimizu
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